

SPECIFICATION

Docket No. **0945RF-42268**

TO ALL WHOM IT MAY CONCERN:

BE IT KNOWN that I, Loren Delaware, residing in the State of New Mexico, have invented new and useful improvements in a

SPRING LOADED THROW ROD

of which the following is a specification:

1

BACKGROUND OF THE INVENTION

2 1. Field of the Invention:

3 The present invention relates generally to switching equipment for railroads,
4 and more particularly to an improved throw rod for track switches.

5 2. Description of the Prior Art:

6 Since the very early days of railroads, switches have been used on tracks to
7 move trains from one track to another. The switch can be moved by either a hand
8 operated device, or a power switch machine.

9 The point of the switch includes two rail tips that are physically moved from
10 side to side to enable the switching to occur. This movement is performed by a
11 throw rod connected to the tips, and to the switching mechanism.

12 In order to insure the integrity of the signal system, and to meet Federal
13 Railroad Administration regulations, it is necessary to regularly inspect and test the
14 point area. This involves having a Signalman test operating of the signal with gaps
15 made with gauges having widths of 1/4 and 3/8 inch. Gaps are forced between the
16 rails using the gauges, and operation of the signals observed.

17 Forcing this gap between the rails places great strain on the switch
18 mechanism. The mechanism is designed to have great strength, and in the case of
19 power switches is able to crush small gravel that works into the space between the
20 rails and force the rails together. However, the additional forces generated by the

1 forcing of gaps between the rails when in a fully thrown position can cause bending
2 of various parts, and other problems that adversely affect operation of the switch.

3 It would be desirable to provide an improved switch design that allows for
4 testing that does not adversely affect the normal operation of the switch, and that
5 does not cause damage to the switch when performed.

SUMMARY OF THE INVENTION

1 In accordance with the present invention, an improved throw rod, which is
2 used to throw the rail switch points, was developed, allowing the use of a spring
3 buffer, to assist maintenance personnel in adjusting the tolerance on the power
4 switch machine throw rod. The improved throw rod, can than be converted, by
5 placing a pin in the spring basket(neutral compressed state), converting the spring
6 loaded throw rod to a solid rod, which provides enhanced performance of the power
7 switch. The improved throw rod includes a housing on its length, with a piston and
8 spring located within the housing. A locking pin locks movement of the piston
9 during normal operation, causing the throw rod to act as a solid rod as previously
10 used in the art. The locking pin can be removed during gap testing, to enable a
11 small amount of play in the length of the rod. This eliminates the stress caused on
12 the switch by testing.

BRIEF DESCRIPTION OF THE DRAWINGS

1 The novel features believed characteristic of the invention are set forth in the
2 appended claims. The invention itself however, as well as a preferred mode of use,
3 further objects and advantages thereof, will best be understood by reference to the
4 following detailed description of an illustrative embodiment when read in
5 conjunction with the accompanying drawings, wherein:

6 Figure 1 is a schematic illustration of a switch;

7 Figure 2 is a cross section of an improved throw rod in accordance with the
8 present invention; and

9 Figure 3 is a schematic diagram of the improved throw rod included with the
10 switch.

DESCRIPTION OF THE PREFERRED EMBODIMENT

1 Figure 1 illustrates a standard track switch 10. Switch 10 includes rails 12,
2 14, 16, and 18. In this switch, rails 12 and 16 define a first track, and rails 14 and
3 18 define a second track. Rail 14 has a tip 20, while rail 16 has a point 22.

4 Switching occurs in the following manner. Rail tips 20 and 22 are connected
5 by a connector arm 24 that maintains the desired spacing between the tips 20, 22.
6 A throw rod 26 is connected to connector arm 24 through a basket 28. Switch
7 machine 30, which can be manual or machine powered, drives throw rod 26 along
8 its length to operate the switch 10. Driving throw rod 26 to the left as shown in
9 Figure 1 causes the second track to be connected, while driving throw rod 26 to the
10 right disconnects the second track from the first track.

11 When gaps must be forced between the rail tips 20, 22 and their adjacent
12 tracks 12 and 18, respectively, tremendous stresses can be experienced in the
13 connector arm 24, basket 28, throw rod 26, and switch machine 30, as well as in
14 the tracks themselves. The improved throw rod described herein eliminates
15 unnecessary stresses otherwise encountered during such gap testing.

16 Figure 2 is a cross section of an improved throw rod in accordance with the
17 present invention. Throw rod 26 includes a connector end 32 adapted to be
18 connected to the basket 28, and a connector end adapted 34 to be connected to
19 the switch machine 30 as known in the art. Instead of being a solid rod, however,
20 throw rod 26 includes a cylinder 36 connected to the end 34, and a piston 38

1 connected to the end 32 as shown. If desired, the connections of the cylinder and
2 piston can be switched without a change in operating.

3 Within cylinder 36 are two springs 40, 42 that limit movement of piston 38
4 within cylinder 36. Pin 44 projects through the walls of cylinder 36 and through
5 piston 38 to lock piston 38 in a fixed position. Pin 44 can be removed by removing
6 cotter pin 46, allowing the piston 38 to move within cylinder 36. Springs 40 and 42
7 are preferably chosen to provide a force of approximately 2000 lbs., or another
8 force that allows piston 38 to move slightly when the forces used to generate the
9 gaps needed for testing are created.

10 During normal operation of the switch, that is at all times except when testing
11 is being performed, pin 44 is placed in position as shown. This prevents movement
12 of piston 38 within cylinder 36, and causes throw rod 26 to operate as a normal,
13 solid rod. So long as pin 44 does not shear from the forces applied, rod 26 will
14 maintain a constant length. If pin 44 does shear during operation, allowing piston
15 38 to move relative to cylinder 36, a problem has generally occurred within the
16 switch. Shearing of pin 44 may prevent damage to other parts of the switch in such
17 event, and can be easily replaced once the problem has been repaired.

18 During testing, pin 44 is removed. Gaps are caused adjacent rail tips 20, 22
19 as known in the art, and movement of piston 38 within cylinder 36 prevents
20 unwanted forces from being applied to the switch. Once testing is completed, the
21 switch is operated to return the piston 38 to a neutral position, and pin 44
22 reinserted.

1 Referring to Figure 3, in a preferred embodiment cylinder 36 is located on
2 throw rod 26 outside the tracks and near the switching machine 30. However, it will
3 be appreciated by those skilled in the art that cylinder 36 can be located at any
4 convenient location along the length of throw rod 26, so long as it lies between
5 switch machine 30 and basket 28. The goal is to ensure that the rod 26 operates
6 as a solid rod during normal operating, and a spring loaded rod during testing.

7 The improved throw rod described herein allows for normal operation, with
8 spring loaded operation only when desired. This is normally desired only during
9 testing, but special circumstances could indicate spring loaded operation during
10 other situations. Because spring loaded operation is selectable, flexibility is
11 available.

12 The spring loaded operation of the rod allows testing to be performed
13 without undue stresses and damage to the switch. This can extend the operating
14 life of a switch, and avoid the need for expensive repairs. The improved throw rod
15 can be installed in any existing switch by simply retrofitting the rod, so that the
16 advantages of the invention can be easily realized in existing switches.

17 While the invention has been particularly shown and described with
18 reference to a preferred embodiment, it will be understood by those skilled in the art
19 that various changes in form and detail may be made therein without departing from
20 the spirit and scope of the invention.